KRASOVSKIY A. A.

Krasovskiy A. A. and Pospelov G. X., "Certain Methods of Calculating the Approximate Temporary Characteristics of Linear Systems of Automatic Regulation," Avtomatika i telemekhanika, 1953, Volume XIV, No 6, Pages 675-689, 4 tables, 3 illustrations; bibliography, 5 items.

KRASOVSKIY, A.A.

SOLODOVNIKOV, V.V.; professor, doktor tekhnicheskikh nauk, redaktor; AYZERMAN, M.A., doktor tekhnicheskikh nauk; BASHKIROV, D.A., kandidat tekhnicheskikh nauk; BROMBERG, P.V., kandidat tekhnicheskikh nauk; VORONOV, A.A., kandidat tekhnicheskikh nauk, dotsent; GOL'DFARB, L.S., doktor tekhnicheskikh nauk, professor; KAZAKEVICH, V.V., doktor tekhnicheskikh nauk; KRASOVSKIY, A.A., kandidat tekhnicheskikh nauk, dotsent; LERNER, A.Ya., kandidat tekhnicheskikh nauk; LETOV, A.M., doktor fiziko-matematicheskikh nauk; professor; MATVEYEV, P.S., inzhener; MIKHAYLOV, F.A., kandidat tekhnicheskikh nauk; PETROV, B.N.; PETROV, V.V., kandidat tekhnicheskikh nauk; POSPELOV, G.S., kandidat tekhnicheskikh nauk, dotsent; TOPCHEYEV, Yu.I., inzhener; ULANOV, G.M., kandidat tekhnicheskikh nauk; KHRAMOY, A.V., kandidat tekhnicheskikh nauk; TSYPKIN, Ya.Z. doktor tekhnicheskikh nauk, professor; LOSSIYEVSKIY, V.L., doktor tekhnicheskikh nauk, professor, retsenzent; TIKHONOV, A.Ya., tekhnicheskiy redaktor

[Fundamentals of automatic control; theory] Osnovy avtomaticheskogo regulirovaniia; teoriia. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1954. 1116 p. (MLRA 8:2)

1. Chlen-korrespondent AN SSSR (for Petrov, B.N.)
(Automatic control)

SOV/112-58-2-2556

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1958, Nr 2, p 123 (USSR)

AUTHOR: Krasovskiy, A. A.

TITLE: A Criterion of Quality in a Regulation Process
(Ob odnom kriterii kachestva protsessa regulirovaniya)

PERIODICAL: Sb. statey po avtomatike i elektrotekhn. M., AS USSR, 1956, pp 5-10

ABSTRACT: A system of automatic regulation is considered ideal if its transfer function

$$\Phi(p) = \frac{a_0 r^n + a_1 p^{n-1} + \ldots + a_n}{b_0 p^m + b_1 p^{m-1} + \ldots + b_m}$$

differs only slightly from the constant $\Phi(p) = a_n/b_m$. The ideal system has the amplitude characteristic $\Phi(j\omega) \approx a_n/b_m$ = const, and the author suggests that the proximity between a given system and the ideal system be evaluated as the difference between $[\Phi(j\omega)]$ and $\overline{\Phi(j\omega)}$ in the frequency interval $\omega < \Omega$. Let $[\Phi(j\omega)] - \phi(j\omega) < \varepsilon$ in this frequency interval; then ε and Ω are, according to the author, the parameters

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APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826110(

SOV/112-58-2-2556

A Criterion of Quality in a Regulation Process

characterizing the quality of regulation. The problem of determining ε and Ω on the basis of a specified $\phi(p)$ is reduced to the problem of the distribution of the roots of two algebraic equations, and it can be solved by Sturm's method. The author points out a simpler but only sufficient condition for the required root distribution, which permits using the conventional stability criteria for determining ε and Ω. Illustration: 1.

M.A.A.

Card 2/2

KRASOVSKIY, A. A.

1936. Krasovskii, A. A., Some problems of the synthesis of systems of automatic control by the method of transitional functions (in Russian), Trudy Vses. Soveshch. po teorii Avtomat. Regulirovaniya, vol. 2, Moscow-Leningrad, Izd-vo. Akad. Nauk SSSR, 1955, 105-124; Ref. Zh. Mekh. no. 10, 1956, Rev. 6625.

Author proposes a new method of synthesis of control systems which makes it possible to select the necessary transitional function of the connection from the transitional functions of the remaining members [illegible], with the required transitional function of the [illegible] automatic system as given.

The basis for this method of synthesis is provided by fairly simple algebraic formulas, from which it is possible to calculate the points of the transitional function of a closed system according to the given transitional functions of an open system or of specific terms. The formulas of this numerical method, which are [illegible] scientific [illegible], were obtained by the author [illegible] E. P. Popov [illegible] on the basis of the examination of linear integral equations [illegible] of the Laplace transformation. It is shown that the accuracy of the calculation according to one of the formulas proposed is greater than that given by [illegible] formula, which is based on the replacement of the Duhamel integral by the sum of [illegible].

E. P. Popov

Courtesy Referativnyi Zhurnal, USSR

Translation, courtesy Ministry of Supply, England

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KRASOVSKIY A.A.

SAVICH, V.A.; KRASOVSKIY, A.A., redaktor; SHUMIKHIN, K.P., tekhnicheskiy redaktor.

[Psychrometric tables] Psikhrometricheskie tablitsy. Leningrad, Gidrometeor. izd-vo, 1957. 251 p. (MIRA 10:11)

(Hygrometry--Tables, etc.)

Krasovskiy, A.A.

KRASOVSKIY, A.A.

Growth of the public health system in the Komi A.S.S.R. Sov.zdrav. 16 no.10:43-44 O '57. (MIRA 10:12)

(PUBLIC HEALTH, hist. in Russia)

KRASOVSKIY, A. A. (Eng. Col.)

(Prof., Dr. Tech. Sci.)

"The Immediate Future of Aviation Automation," Sovetskaya Aviatsiya, 29 June 1957, p. 2.

Summary - 1156350

KRASOVSKIY, A.A.

"On Two-Channel Automatic Control Systems With Antisymmetrical Bonds," by A. A. Krasovskiy, Moscow, submitted for publication 13 October 1955, Avtomatika i Telemekhanika, Vol 18, No 2, Feb 57, pp 126-136

The article studies linear two-channel systems with asymmetric cross bonds. The classification of asymmetric bonds is presented and transfer functions with complex parameters are introduced. The effect of different asymmetric bonds on increasing the stability margin and the critical gain of the system are analyzed. The author holds that two-channel systems are more useful for the synthesis of corrective devices than are single-channel systems. He shows that the introduction of cross bonds provides a considerable enlargement of the stability field.

The author cites a book by R. A. Renkin [name transliterated from Russian], The Mathematical Theory of the Motion of Unguided Rockets, 1951.

SUM. 1305

MÜLLER, Ferdinand; RUMYANTSEV, Ye.A. [translator]; KRASOVSKIY, A.A., red.

[Remote control; a systematic survey of methods and equipment used in remote control] Teleupravlenie; sistematicheskii obzor metodov i ustanovok teleupravleniia. Moskva, Izd-vo inostr.lit-ry, 1957. 310 p. Translated from the German. (MIRA 14:3)
(Remote control)

KOLOSOV, Sergey Petrovich; SOTSKOV, B.S., prof., doktor tekhn. nauk, retsenzent; KRASOVSKIY, A.A., prof., doktor tekhn. nauk, retsenzent; INOZEMTSEV, S.P., dots., kand. tekhn. nauk, red.; LOSEVA, G.F., red. izd-va; ROZHIN, V.P., tekhn. red.

[Elements of automatic equipment for aviation] Elementy aviatsionnykh avtomaticheskikh ustroistv. Moskva, Gos. izd-vo obor. promyshl., 1958. 382 p. (MIRA 11:9)

(Airplanes—Equipment and supplies)

KRASOVSKIY, A.A.

3(4,7) PHASE I BOOK EXPLOITATION SOV/2440

Vsesoyuznyy gidrologicheskiy s"yezd, 3rd, Leningrad, 1957.

Trudy...t. III: Sektsiya gidrofiziki (Transactions of the 3rd All-Union Hydrological Convention. v. 3: Hydrophysics Section) Leningrad, Gidrometeoizdat, 1959. 470 p. Errata slip inserted. 2,000 copies printed.

Sponsoring agency: Glavnoye upravleniye gidrometeorologicheskoy sluzhby pri Sovete Minstrov SSSR.

Resp. Ed.: V.A. Uryvayev; Ed.: V.S. Protopopov; Tech. Ed.: M.I. Braynina.

PURPOSE: This work is intended for meteorologists, hydrologists, and hydrophysicists, particularly those engaged in the study of snow and ice and evaporation processes.

COVERAGE: This book contains papers on hydrophysics which were presented and discussed at the Third All-Union Hydrological Conference in Leningrad, October 1957. The Conference published 10 volumes

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on various aspects of hydrology of which this is number 3. The editorial board in charge of the series include: V.A. Uryvayev (Chairman), O.A. Alekin, Ye.V. Bliznyak (deceased), O.N. Borsuk, M.A. Velikanov, L.K. Davydov, A.P. Domanitskiy, G.P. Kalinin, S.N. Kritskiy, B.I. Kudelin, L.F. Manoim, M.F. Menkel', B.P. Orlov, I. V. Popov, A.K. Proskuryakov, D.L. Sokolovskiy, O.A. Spengler, A.I. Chebotarev, and S.K. Cherkavskiy. This volume is divided into 2 sections: the first contains reports from the subsection for the study of evaporation processes, and the second contains reports from the snow and ice subsection. References accompany each article.

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3(7)

AUTHOR: Krasovskiy, A. A. SOV/50-59-1-15/20

TITLE: The Problem of Calculating Precipitations in Winter (K voprosu ob uchete zimnikh osadkov)

PERIODICAL: Meteorologiya i gidrologiya, 1959, Nr 1, pp 60-61 (USSR)

ABSTRACT: A paper by N. V. Razumikhin on the calculation of winterly precipitations in the southern Trans-Volga region is criticized. Snow masses blown into the pluviometer by ground snowstorms are measured although the storms were blowing under a clear sky and precipitations were not real. The daily evaporation from the snow cover is fully neglected on the other hand. This shows that the meteorological service is in a bad way concerning the measurements of winterly precipitations. It would be high time to develop a reasonable method of determining the evaporation losses of the snow cover. There are 1 table and 5 Soviet references.

Card 1/1

KRASOVSKIY, A.A.

28(1) SOV/30-59-1-48/57

AUTHOR: Morosanov, I. S.

TITLE: Development of the Theory and the Application of Discreet Automatic Systems (Razvitiye teorii i primeneniy diskretnykh avtomaticheskikh sistem)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 1, pp 138-139 (USSR)

ABSTRACT: The conference dealing with this problem took place in Moscow from September 22 to 26, 1958 and was opened by V. A. Trapeznikov, chairman of the Natsional'nyy komitet SSSR po avtomaticheskomu upravleniyu (National Committee of the USSR for Automatic Control). In the Plenary Meeting Ya. Z. Tsypkin reported on discreet automatic systems and their development prospects. The work of the conference was undertaken by 5 sections. Reports were held by:].
G. P. Tartakovskiy and V. P. Perov reported on new investigation results in the case of pulse systems with variable parameters.
Fan Ch'ung-wei dealt in his report with his successful procedures of analysis of pulse systems with several elements.
F. M. Kilin spoke about the problem of an increase of the perturbation stability of the systems.

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Ya. Z. Tsypkin investigated the possibilities of pulse systems.
A. A. Krasovskiy investigated one of the possible ways of constructing an automatic control system with a discreet correcting device.
E. A. Kregiue analysed pulse systems.
A. V. Pyshkin investigated the conditions of eigen oscillations (avtokolebaniye) in a system with wide range pulse modulation.
Ya. V. Doltelenko reported on the method of determining parameters of a boundary cycle for an extreme system.
V. V. Kazakevich dealt with the results of approximation calculation methods of extreme systems.
A. A. Fel'dbaum investigated the influence of perturbations.
A. G. Butkovskiy and S. N. Domanitskiy reported on the construction of optimum control systems for objects with retardation.
G. K. Natshafova investigated methods of determining the maximum ... effect of control systems.
O. G. Varshavskiy spoke about the construction of an automatic machine for objects with retardation which permits the best possible control systems.

Card 2/3

M. A. Gavrilov analysed modern telemechanical equipment from the viewpoint of the so-called "finite automatic machines" (consisting of systems of a finite number of elements).
P. P. Parkhomenko reported on the effect and construction of a special logical machine for the analysis of relay orders.
Yu. Ya. Bazilevskiy investigated accurate "finite automatic machines" which in the case of an unvariable structure furnish arbitrary items of several arguments.
G. K. Barenda and ... reported on a pneumatic system of elements of "finite automatic machines" with the logical elements described as "not", "and", "or" by means of which further logical functions can be put into practice.
The participants in the conference considered the technical working out of the papers presented to them insufficient. In the last session the heads of the committees summarized the results obtained at the conference and briefly mentioned the important tasks in further developing the theory and the application of discreet automatic systems.

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S/024/60/000/03/005/028
E140/E463

AUTHOR: Krasovskiy, A.A. (Moscow)

TITLE: Dynamics of Continuous Systems of Extremal Regulation with Random Scanning Signals

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1960, Nr 3, pp 37-45 (USSR)

ABSTRACT: A continuation of the work in Ref 1, where the same problem was considered for harmonic scanning oscillations in the absence of random fast perturbations. The present article considers random scanning signals and the presence of noise. The scanning signal generators give signals assumed independent of each other and of the noise present. It is further assumed that the random time functions have zero mathematical expectation. The independence condition can also be substituted by the weaker condition of vanishing of the mathematical expectations of the products of these random functions. The random scanning signal introduces a small displacement of the regulated object and the gradient of the change with respect to the regulated quantity is detected and processed. If it is found that the

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VC

S/024/60/000/03/005/028
E140/E463

Dynamics of Continuous Systems of Extremal Regulation with Random Scanning Signals

displacement results in deviation away from the desired extremal, a correction step is introduced. The precision of the extremal regulation may be analysed by various criteria the simplest of which is the mathematical expectation of the difference $F - F_e$, where F is the function toberegulated and F_e is its value at the extremal. Due to the scanning procedure there is a certain loss of precision even in the absence of noise. The simplest analysis is obtained when the scanning signal is close to white noise. This type of signal also gives the most advantageous results according to the present analysis which, however, neglects the inertia of the regulated object. There are 2 figures and 6 Soviet references.

SUBMITTED: January 23, 1960

Card 2/2

VC

SOV/24-59-3-7/33

AUTHOR: Krasovskiy, A. A. (Moscow)

TITLE: The Dynamics of Differentiating Continuous-Action Peak-Holding Systems.

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1959, Nr 3, pp 43-49 (USSR)

ABSTRACT: The treatment relates to systems having relatively few adjustable parameters, and it is assumed that the form of the peak can be approximated by a quadratic equation within the working range of the regulator. Further, it is assumed that phase-sensitive methods are used with small forced deviations provided by a special signal to provide the derivative signals (i.e. the partial derivatives of the output with respect to the adjustable parameters; a separate frequency is assigned to each such parameter). The usual methods of examining stability and transient response in linear systems are then applied. The case in which the various partial derivatives differ greatly in magnitude is considered briefly at the end, in relation to coupled peak-holding systems, i.e. systems in which the rate of change of any one coordinate is

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SOV/24-59-3-7/33

The Dynamics of Differentiating Continuous-Action Peak-Holding Systems

proportional to a linear combination of all the partial derivatives (and not to just one partial derivative). The paper contains 4 figures and 12 references, of which 11 are Soviet and 1 is English.

SUBMITTED: January 12, 1959.

Card 2/2

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S/109/60/005/04/003/028
E140/E435

AUTHORS: Krasovskiy, A.A. and Zuykov, V.N.

TITLE: Limiting Threshold of Sensitivity of Thermal Radio-Radiation Reception

PERIODICAL: Radiotekhnika i elektronika, 1960, Vol 5, Nr 4, pp 544-550 (USSR)

ABSTRACT: On the basis of Einstein's formula for radiation-energy fluctuations, an expression is obtained for the limiting threshold of sensitivity of thermal radio-radiation,5 receivers. The wavelength brightness temperature plane is divided into two regions. In the first the usual formulae for threshold of sensitivity are valid and in the second region that of short wavelengths and low temperatures, the present formulae are valid. The expressions are valid for arbitrary types of receiver structure (with antenna, absorption cell etc). There are 1 figure and 12 references, 3 of which are Soviet and 9 English.

SUBMITTED: April 2, 1959

Card 1/1

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R000826110(

KRASOVSKIY, A.A.

report to be presented at the 1st Intl Congress of the Intl Federation of Automatic Control, 25 Jun-5 Jul 1960, Moscow, USSR.

[illegible], M. L. - "Ultra stability in electronic calculating devices in the solution of nonlinear equations in indefinite form"
CHELYUSTKIN, A. B. - "Use of calculating devices in systems for the automatic control of rolling mills"
CHICHINADZE, V. K. - "Concerning some problems of the organization of self-adjusting and self-teaching systems of automatic control, based on principles of random search"
DAVYDOV, E. I. - "Development of automatic control systems for boiler units"
DUDNIKOV, Ye. G. - "Determination of optimum adjustments of industrial automatic regulation systems according to initial data obtained from experience"
DUB'YE, A. I., and ROZENVASSER, E. N. - "Methods of organizing Lyapunov functions in the theory of nonlinear regulating systems"
[illegible], N. N. - "Balanced regulation and inter-communications of a multi-motor electric drive and technology in continuous rolling mills"
FEL'DBAUM, A. A. - "Problems of statistical theory of automatic optimization systems"
[illegible], V. I. - "Automation of a reversible cold rolling mill for nonferrous metals"
FILIPPOV, A. F. - "Application of the theory of differential equations with a discontinuous right side to nonlinear problems of automatic regulation"
GAVRILOV, M.A. - "Structural surplus and operational reliability of relay devices"
GANKIN, M. Z. - "Automation of irrigation systems"
GERSHENBERG, G. R., [illegible], V. E., [illegible], M. P., [illegible], L. R., and [illegible], L. S. - "Power regulation of disturbance and problems of the stability of electric power systems"
GINZBURG, S. A. - "Logical method of synthesis of functional converters"
IL'IN, V. A. - "Methods of transmission of information and the structure of telemechanical systems for dispersed structures"
INOSOV, V. L., and LUTSKIY (fnu) - "The code-impulse system of telemeasurement for dispatched operations of trunk-line gas pipe lines"
IVAKHNENKO, A.G. - "Concerning the application of the theory of combined regulation systems for cybernetic adaptation systems"
KARANDEYEV, K. B., and SHTAMBERGER, G. A. - "A quasi-equilibrated bridge as an element in a system of automatic control"
KAZAKEVICH, V. V. - "Concerning the process of extra regulation of inert objects in the presence of disturbance"
KAZAKOV, I. Ye. - "Some problems of the theory of statistical linearization and its application"
KILIN, F. M. - "Some problems of the theory of impulse systems with time selectors"
KOBRINSKIY, A. Ye., BOLKHOVITIN, S. V., VOSKOBOYNIKOV, L.M., IOFFE, D. M., POLYAN, Ye. P., POPOV, B. P., SLAVUTSKIY, Ya. L., SYSIN, A. Ya., and YAKOBSON, Ya. S. - "The problem of bioelectric control"
KOLOMIYETS, B.T. - "New types of photo resistances and their field of use"
KOROBKO, M. L., [illegible], B. G., and SHUMILOV, K. A. - "System of automatic control and regulation of blast distribution in the tuyeres of blast furnace"
KOROBOCHKIN, B. L. - "Investigation of the dynamics of the hydraulic duct of a copying lathe"
KRASOVSKIY, A. A. - "Dynamics of continuous systems of automatic regulation with extra self-adjustment of corrective devices"
KRASOVSKIY, N. N. - "Concerning the selection of parameters of optimum stability systems"
KUKHTENKO, A. I. - "The dynamics of devices imitating living organisms"
KULEBAKIN, V. S. - "The invariant theory of automatic regulation and control systems"
LANIN, I. D. - "Pneumatic calculating devices as a means of insuring the reliability of complex automation systems"
LAZAREV, V. G., and PARKHOMENKO, P.P. - "Mechanization of processes of analysis and synthesis of the structure of relay devices"

16,8000

S/194/61/000/002/027/039
D216/D302

AUTHOR: Krasovskiy, A.A.

TITLE: Synthesis of self-adjusting automatic control systems with discrete correcting arrangements

PERIODICAL: Referativnyy zhurnal. Avtomatika i radioelektronika, no. 2, 1961, 36, abstract 2 V283 (V sb. Teoriya i primeneniye diskretn. avtomat. sistem, M., AN SSSR, 1960, 101-118)

TEXT: The method is given of determining the optimum weighting function of a closed linear system (from the condition of minimum dispersion of error) with discrete correcting arrangement, the transfer function of which secures an optimum transfer function of the whole system. It is assumed that at various instants, spaced by time T, the values of the random component are statistically independent and that the useful component in which the minimization of the deviation, from its optimum, of the real weighting function

B

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Synthesis of self-adjusting... S/194/61/000/002/027/039
D216/D302

is achieved by means of varying the parameters of the correcting device. 5 references.

B

Card 2/2

KRASOVSKIY, A.A.

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S/024/60/000/04/007/013
E140/E463 82211

AUTHOR: Krasovskiy, A.A. (Moscow)

TITLE: Statistical Dynamics of a System with Proportional Extremal Self-Adjustment of Series Corrective Networks

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1960, No.4, pp.121-129

TEXT: Self-adjustment of corrective networks is required to ensure stability or programme variation of dynamic properties of control systems in the presence of large variations of the characteristics of part of the system. The article considers the dynamics of a system with self-adjustment of series corrective networks consisting of a set of parallel connected filters with variable gain factors. This system is easily realized and in a certain sense is most accessible to theoretical analysis. The basis of the system is the comparison of the dynamic properties of the basic open-loop system with those of a certain standard filter. The self-adjustment system is passive if the two sets of properties are identical, but varies the properties of the corrective network in a given manner if a difference exists until that difference vanishes. The variation may be regular or random.

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E140/E463 82211

Statistical Dynamics of a System with Proportional Extremal Self-Adjustment of Series Corrective Networks

The case of minimum mathematical expectation of the square of the error in the open-loop system is solved with search signal in the form of white noise. The closed-loop equations are then found. Two forms of the quasi-stationary regime are then examined: the case of strong filtering and a general case, described by non-linear differential equations with random functions as the coefficients. The general case may be solved by a method of successive approximations where the first approximation is the solution of the strong filtering case. The convergence of the process depends on the degree of filtering in the system. There are 1 figure and 6 references: 5 Soviet and 1 English.

Card 2/2

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S/103/60/021/009/008/013
B012/B063

AUTHOR: Krasovskiy, A. A. (Moscow)

TITLE: The Theory of Two-channel Servo-systems With a Relay Element in the Alternating-current Circuit

PERIODICAL: Avtomatika i telemekhanika, 1960, Vol. 21, No. 9, pp. 1293-1305

TEXT: The present article describes a comparatively general method of investigating two-channel servo-systems with relay elements in their alternating-current circuits. Some of their common properties are mentioned, and it is noted that the method given here is convenient for the solution of concrete problems. The above-mentioned two-channel servo-system is schematically shown in Fig. 1, and an appendage to the present paper contains the complete system of equations (4) of the transfer functions. The relay systems of this type mainly operate with self-oscillations. To determine stabilized self-oscillations, the solution of system (4) is sought in the form of (5). The kind of this approximate solution corresponds to the method of harmonic equilibrium (Ref. 4). If this method

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The Theory of Two-channel Servo-systems With a Relay Element in the Alternating-current Circuit

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is applied to two-channel systems with modulation and a non-linear element in their alternating-current circuit, it becomes an exact method for the determination of self-oscillations in the case of unbounded increase of the carrier frequency. This is achieved by neglecting the harmonics of the carrier frequency Ω or the combined frequency $\Omega \pm \omega_a$ instead of the harmonics of the self-oscillation frequency ω_a. In this connection the author refers to a paper by L. S. Gol'dfarb (Ref. 4). The stability of self-oscillations according to Lyapunov is investigated next. An approximate equation (13) is derived for the deviations of self-oscillations, and an approximate criterion is formulated for the stability of self-oscillations in the above-mentioned systems having relay elements. It is shown that this criterion follows formula (13). The author determines the transfer function of the system linearized by self-oscillations with respect to slow control actions. It is noted that the characteristic equation (22), which corresponds to the transfer function in the case of slowly varying input quantities, agrees with equation (13) up to

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82940

The Theory of Two-channel Servo-systems With a Relay Element in the Alternating-current Circuit

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one summand. This indicates that, if there are stable self-oscillations, self-oscillating servo-systems are analogous to stable, linear systems as far as the reproduction of slowly varying input quantities is concerned. In the self-oscillating relay systems under discussion, the reaction to slow disturbances is independent of the absolute value of the amplification factor of the open circuit. Finally, it is said that the above-described method may be applied to relay elements having hysteresis and an insensitive range. There are 5 figures and 8 Soviet references.

SUBMITTED: November 19, 1959

4

Card 3/3

S/024/61/000/001/003/014
E197/E435

AUTHOR: Krasovskiy, A.A. (Moscow)

TITLE: Certain conditions for the application of self adjusting systems in automatically controlled continuous productive processes

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1961, No.1, pp.97-109

TEXT: The author examines general schemes of continuous production systems in which the controlling devices, such as drives, plant and regulators which control the process, are set automatically. The principle is based on obtaining a quality index of production and keeping it within certain limits and utilizes the natural fluctuations of the parameters of production superimposed by quality searching oscillations where advisable. Such self adjusting processes are analysed in an approximate, qualitative manner. The essential conditions and requirements of a control loop are postulated, both with respect to the self adjustor and to the automated process itself. The author prescribes that there shall be a number of adjustments on the machines, tools, equipment and regulators which control the manufacturing process.
Card 1/4

Certain conditions ... S/024/61/000/001/003/014
E197/E435

Each of these has some sort of adjustment which is suitable to be set to produce a certain quality and quantity of a product. Simultaneously with the planned adjustment of the process, various other factors will tend to upset the required quality index, such as variation in the raw materials, wear and tear, change of temperature, perturbations in production variables and the like. The effect of the main disturbing factors should be capable of being expressed precisely in terms of a change in the set point of the control elements. The author introduces the term "period of misalignment", meaning the time period for which the product remains within specified limits with no change in set points. For self-adjusting systems that period must be very long in comparison with the response time to plant disturbances. It is further postulated that any output parameter shall be dependent on one adjustment only, if there should be no interaction between loops. The plant will be subject either to perturbations inherent in the system or to induced perturbations. Self-adjustment is accomplished by correlating the measured perturbations with their effect and by a network of delay lines precisely equivalent to the delay prevailing in the manufacturing process itself. Such a
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system was first proposed and realized by A.B.Chelyustkin (Ref.3: Application of Computers to Automatic Control Systems in Rolling Mills, Proceedings of IFAC, 1960). In general, the minimum time needed for an effective self-adjustment will be 4 to 6 times the process lag. The author arrives at the following conclusions. 1. A satisfactory transient response of the self-adjustment processes can be achieved if the magnitude of the controlled high-frequency search oscillations is sufficient for unambiguous separation of the desired component of the correlator signals for given storage times. 2. When the automatic-adjustment system of the equipment is switched on, the time of self-adjustment should be less than the misalignment time when the positions of the adjustment organs remain fixed. 3. The self-adjustment time should exceed the delay time of the production - quality control and the signal storage time. 4. Low-frequency components of the errors of the production parameter control, whose correlation times exceed the self-adjustment times, introduce parameter errors of the same order as the control errors and should satisfy the corresponding tolerances. 5. The higher the level of the primary automation of a production process the longer will be the

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R00082611O(

Certain conditions ... S/024/61/000/001/003/014
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misalignment time (other conditions being equal) and the more successful the automatic-adjustment control systems for production processes. There are 2 figures and 6 Soviet references.

SUBMITTED: October 29, 1960

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30555
S/569/61/002/000/008/008
D298/D302

16.8000 (1031, 1132, 1329)

AUTHOR: Krasovskiy, A.A. (USSR)

TITLE: Dynamics of continuous systems with extremum self-adjustment of compensating networks

SOURCE: IFAC, 1st Congress, Moscow 1960. Teoriya diskretnykh, optimal'nykh i samonastraivayushchikhsiya sistem. Trudy, v. 1, 1961, 962 - 977

TEXT: The first-approximation integro-differential equations are derived for continuous systems with extremum adjustment of compensating networks. It is shown that for quasistationary conditions, these equations degenerate into the equations of an extremal continuous system. The stability conditions are stated for the quasistationary process. By another work of the author (which is in print), control systems with adaptive compensating networks are divided into 3 groups: 1) With open loop compensating networks; 2) With closed-loop compensating networks, and 3) With extremum adjustment of compensating networks. In system 3), values of the pa-

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Dynamics of continuous systems ... S/569/61/002/000/008/008
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rameters of the compensating network are searched which correspond to the extremum of the performance criterion of the process and to stabilization; the performance criterion is a functional of the parameters of the compensating network. A block diagram of the system is shown. The square deviation ε^2 is a measure of the difference of response, to the control signal θ, on the part of the control system Φ (which contains the compensating network, the controller, and the plant) and the reference filter Φ_0, respectively. The quantity ε^2 is applied to m synchronous detectors, where the search oscillations $\delta x_1, \delta x_2, \ldots, \delta x_m$ arrive as well. From the configuration it is evident that the process of parameter self-adjustment will continue as long as the quantity ε^2 has components which are synchronous with search oscillations. These components vanish only at the extremum (minimum) point of a certain mean value of ε^2. The adjustment process depends largely on the form of the control signal θ. If θ does not provide in itself a sufficiently regular adjustment, additional random- or regular signals have to be applied to the system input; in the following, θ in conjunction with the

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additional signals, will be called the test signal θ. The test signal, as well as the search oscillations are assumed to be random (in the general case - non-stationary) functions of time; the results can be readily extended to regular test- and search signals. It is assumed that the weight (impulse) function K of the principal loop is analytic with respect to the adjustment parameters x_i, viz.

$$x_i = X_i + \Delta x_i$$

$$K(t, \tau, x_i) = K(t, \tau, X_i) + \sum_{i=1}^{m} \frac{\partial K}{\partial x_i} \Delta x_i + \frac{1}{2!} \sum_{i=1}^{m} \sum_{j=1}^{m} \frac{\partial^2 K}{\partial x_i \partial x_j} \Delta x_i \Delta x_j + \ldots; \tag{1}$$

the output variable ε is related to the input variable θ by the equation

$$\varepsilon(t) = \int_{-\infty}^{\infty} K(t, \tau, x_i)\, \theta(\tau)\, d\tau.$$

Hence

$$\varepsilon^2 = \int_{-\infty}^{\infty} K(t, \tau, x_i)\, \theta(\tau)\, d\tau \int_{-\infty}^{\infty} K(t, \tau, x_i)\, \theta(\tau)\, d\tau =$$

$$= \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} K[t, \tau_1, x_i(\tau_1)]\, K[t, \tau_2, x_i(\tau_2)]\, \theta(\tau_1)\, \theta(\tau_2)\, d\tau_1\, d\tau_2. \tag{2}$$

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The mathematical expectation of the output variable of a linear operator, equals the operator of the expectation; hence

$$X_i = \frac{W_F}{D} M(\varepsilon^2 \delta x_i), \tag{4}$$

where $X_i = M(x_i)$ is the mathematical expectation of the i-th parameter, and $W_F(D)$ is the transfer function of the filter. Two simplifying assumptions are made: a) the dispersion of $W/D\ \delta u_i$ (u being a random function) is much smaller than the dispersion of δx_i, and b) only the first two terms of series (1) are retained. Hence one obtains the first-approximation integro-differential equations:

$$DX_i = 2W_{\Phi}(D) \times \times \int_{-\infty}^{\infty} \int_{-\infty}^{\infty} K[t, \tau_1, X_i(\tau_1)] \frac{\partial}{\partial X_i} K[t, \tau_2, X_i(\tau_2)] R_{\theta_i}(\tau_2, t) R_\theta(\tau_1, \tau_2) d\tau_1 d\tau_2. \tag{9}$$

$$(i = 1, 2, \ldots, m)$$

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(R is the correlation function). These are general equations which apply to both stationary- and non-stationary δx_i and θ, and cover many particular cases, as for example: 1) The correlation time of the search signals is much larger than the time of the transient processes in the principal loop. 2) The test signal is a white noise. 3) The test signal and the search signal are stationary. In addition, the case of quasi-stationary conditions is considered in more detail. In this case, Eq. (9) becomes

$$DX_i = \overline{\delta^2 x_i} W_F(D) \frac{\partial}{\partial X_i} \overline{\varepsilon^2}(q, X_1, X_2, \ldots, X_m), \qquad (13)$$

where $\overline{\varepsilon^2}(q, X_1, X_2, \ldots, X_m) = \int\limits_{-\infty}^{\infty}\int\limits_{-\infty}^{\infty} K(t-\tau_1, X_i, q) K(t-\tau_2, X_i, q) R_\theta(\tau_1, \tau_2) d\tau_1 d\tau_2,$

(after setting $\overline{\delta^2 x_i}$ = const). Eq. (13) is analogous to the equations of a continuous system of extremum control by the method of gradient (considered in an earlier work by the author). The notation $W_F(D) = -aW(D)$ is introduced, where $W(D)$ is the normalized

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transfer function. In the case of quasi-stationary self-adjustment with white-noise test-signal, one obtains:

$$DX_i = - aW(D) \frac{\partial I}{\partial X_i} \qquad (15)$$

where I is the integral square estimate of K. For linear systems with lumped parameters, the derivatives $\partial I/\partial X$; $\partial^2 I/\partial X_i \partial X_j$ can be found analytically. The quasi-stationary process is stable if the minimum condition

$$X_i = X_e; \quad \frac{\partial I}{\partial X_i} = 0; \ (i = 1, 2, \ldots, m)$$

holds, the m roots of

$$\begin{vmatrix} \lambda - a_{11} & a_{12} & \ldots & a_{1m} \\ a_{21} & \lambda - a_{22} & \ldots & a_{2m} \\ \cdot & \cdot & \cdot & \cdot \\ a_{m1} & a_{m2} & \ldots & \lambda - a_{mm} \end{vmatrix} = 0, \qquad (16)$$

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D298/D302

are positive, and the lag of the filters is negligible. A discussion followed. Taking part were: V.N. Varygin, Tarasov, I.Ye. Kazakov, R.I. Stakhovskiy (USSR), A. Straszak (Poland). There are 3 figures, and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc (in translation.)

X

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S/588/61/000/004/001/011
D234/D303

16.8000

AUTHOR: Krasovskiy, A.A.

TITLE: Principles of search and the dynamics of continuous systems of extremum control

SOURCE: Avtomaticheskoye upravleniye i vychislitel'naya tekhnika, no. 4, Moscow 1961, 5 - 49

TEXT: The first part of the article is a survey of the principles of search. The following subjects are considered: Examples of systems of extremum control; methods of extremum search (synchronous detection during harmonic oscillations of search, for determining the gradient; method of time derivative for the same purpose; method of extremum memorizing; Gauss-Seidel method of alternating changes of variables; method of the gradient; method of quickest descent); structure of the systems. The second part deals with the dynamics of many-dimensional systems of extremum control in case of regular or random search signals and is based on previous publications of the author. There are 20 figures and 20 references: 19

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Principles of search and th(... S/588/61/000/004/001/011 D234/D303

Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: S. Drapper and I.T. Li. Principles of optimalizing control systems and an application to internal engine. ASME publications 1951.

VB

Card 2/2

89170

S/103/61/022/002/001/015
B104/B201

16.9500 (1031, 1121, 1132)

AUTHOR: Krasovskiy, A. A. (Moscow)

TITLE: Antisymmetric feedback two-channel servosystems with random disturbances

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 2, 1961, 143-156

TEXT: In Refs. 1 and 2 the author has studied two-dimensional linear systems and relay systems with antisymmetric feedback in the presence of a regular control and random disturbances. The statistical dynamics of similar systems is examined in the present paper. The first part is devoted to linear stationary systems with complex transfer functions which are under the influence of random disturbances. Fig. 1 shows a block diagram relative to such systems, in which the antisymmetric feedbacks are indicated by dotted lines. The complex input quantity of this system is expressed by the relation $\overline{x}_{in} = x'_{in} + jx''_{in}$ and the noise $\overline{f}_0 = f'_0 + jf''_0$. Caused by $\overline{x}_{in}$, $\overline{f}_0$, the disturbances $\overline{f}_i = f'_i + jf''_i$ $(i = 1,\dots,\nu)$ act upon the various points of the system, and $\overline{x}_{in}$, $\overline{f}_0$, and $\overline{f}$ are regarded as independent

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continuous random functions. Thus, all these functions may be represented as $\overline{x}_{in} = W_{in}\overline{g}_{in}$, $\overline{f}_i = W_{fi}\overline{g}_{in}$, $(i = 0,1,\ldots,\nu)$ (1), where W_{in} and W_{fi} denote complex transfer functions of the so-called shaping filters, $\overline{g}_{in}$ and $\overline{g}_i$ are independent random functions with a constant spectral density (white noise). With reference to his previous studies the author finds expressions for the pulse-transfer functions and obtains the following expression for the error $\overline{\Delta x} = x_{out} - \overline{x}_{in}$:

$$\overline{\Delta x} = -\frac{W_{in}}{1+W}\overline{g}_{in} + \frac{WW_{fi}}{1+W}\overline{g}_0 + \sum_{i=1}^{\nu}\frac{W_iW_{fi}}{1+W}g_i \quad (3),$$

where W denotes the complex transfer function of the open circuit, W_i is the transfer function from the i^{th} input to the output. The pulse-transfer function of a two-channel system can be described as follows: $\overline{k}(t) = k'(t) + jk''(t)$, and it is shown that the generalized complex transfer functions of the system investigated correspond to the transfer functions in the expression (3):

$$\overline{k}(t) \ldots\ldots - W_{in}/(1+W),\ k_i(t) \ \ldots\ WW_{fi}/(1+W),\quad (i = 0,1,\ldots,\nu).$$

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Proceeding from these results, the author passes over to the representation of the input quantities of the system by complex weight functions (transfer functions), and discusses an estimation made for the weight functions. The second part deals with servosystems with relays in the a-c channel and a two-channel section possessing an infra-low frequency. The system shown in Fig. 4 and already examined in a previous paper, is taken as a basis. Regarding the expected mathematical value, the principal mode of operation of this system is shown to be its natural oscillation. The production of natural oscillations in this system is discussed, and the equivalent circuit shown in Fig. 9 for the system considered is discussed thoroughly. This equivalent circuit reproduces the statistical dynamics of the system accurately in the case of white noise, and by approximation in the case of any noise with Gaussian distribution. A thorough investigation of a suppression of the noise in the relay element shows that it has an effect solely upon such an amplitude of oscillations—as considerably exceeds the mean square root of the noise. It is further shown that the oscillations possess a determined frequency and can therefore be filtered with suitable circuits without modifying the dynamic properties of the entire system. There are 11 figures and 9 Soviet-bloc references.

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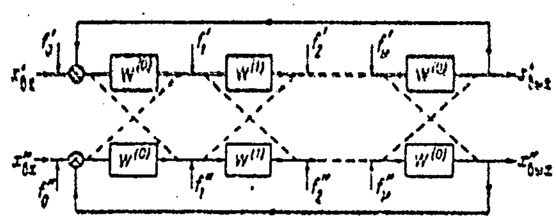
SUBMITTED: May 24, 1960

Legend to Fig. 1: $x'_{\text{вх}}$ and $x''_{\text{вх}}$ correspond to x'_{in} and x''_{in}, $x'_{\text{вых}}$ and $x''_{\text{вых}}$ correspond to x'_{out} and x''_{out}.

Fig. 1



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Legend to Fig. 4: I is a modulator, II is an a-c channel, III is a demodulator, and IV the two-channel section of the circuit.

Fig.4

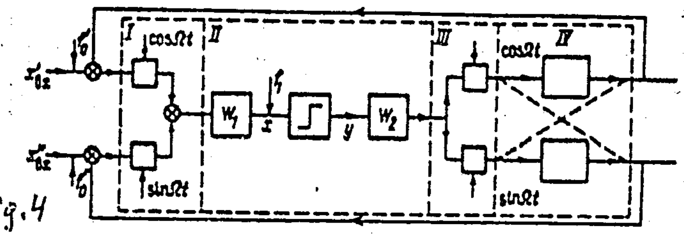

Fig. 4

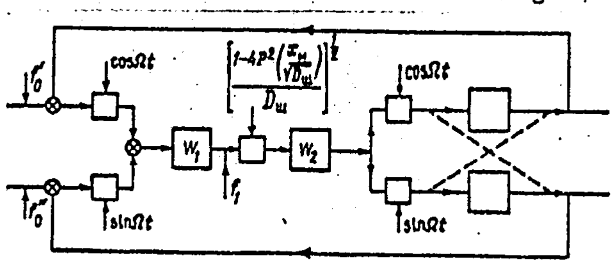

Fig. 9

Fig. 9

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26771
S/103/61/022/006/006/014
D229/D304

6.4400

AUTHOR: Krasovskiy, A.A. (Moscow)

TITLE: Extremum reception of signals

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 6, 1961, 730 - 738

TEXT: The author considers a principle of extremum reception which is as follows: The signal received consists of a useful component f_s and a disturbance f_{sh}. The general form of the former is supposed to be known and is characterized by some parameters, such as amplitude, frequency, duration and phase of pulses etc. The signal is compared with that of an automatically tuned internal generator f_g, the generator being so designed that the difference $f_c - f_g$ can be made arbitrarily small. The difference between the received and the generated signal is sent to a difference estimation unit, the output quantity of which is sent to an optimizer - a system of

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extremum regulation which secures the finding and realization of generator tuning that gives minimum estimation of the deviation. The useful output signal of the system is that of the generator, or only the parameters of the tuning. The method of search is the gradient method. The author deduces the system of equations of extremum reception which are non-linear, and formulates the assumptions for quasi-stationary reception under which the equations become linear. No analysis of consistency of the assumptions is made, but it is claimed that these are consistent for several specific cases. A characteristic equation of stability of extremum reception under these assumptions is given. The possible stability against disturbances is found to be equivalent to that of the correlation reception, but the latter requires exact previous realization of carrier functions in the receiver while extremum reception does not. This constitutes the chief advantage of the latter. An example is studied in detail. There are 4 figures and 6 Soviet-bloc references.
SUBMITTED: August 30, 1960

Card 2/2

KRASOVSKIY, A. A.

"Optimal Searching Techniques for Control Sampled Data Extremum Control Systems."

Presented at IFAC International Federation of Automatic Control Symposium on Self Adjusting System Theory, Rome 26-28 Apr 62

KRASOVSKIY, Aleksandr Arkad'yevich; POSPELOV, Germogen Sergeyevich; KOROLEV, N.A., red.; BUL'DYAYEV, N.A., tekhn. red.

[Principles of automatic control and engineering cybernetics] Osnovy avtomatiki i tekhnicheskoi kibernetiki. Moskva, Gosenergoizdat, 1962. 599 p. (MIRA 16:1)

(Cybernetics) (Automatic control)

KRASOVSKIY, A. A.

"Problems in the Theory of Continuous Systems of Extremum Process Control."

Paper to be presented at the IFAC Congress held in
Basel, Switzerland, 27 Aug to 4 Sep 63

AM4037979 BOOK EXPLOITATION S/

Krasovskiy, Aleksandr Arkad'yevich

Dynamics of continuous self-adjusting systems (Dinamika neprery*vny*kh samonastraivayushchikhsya sistem), Moscow, Fizmatgiz, 1963, 468 p. illus., biblio., index. 8,000 copies printed.

TOPIC TAGS: automation, computer engineering, continuous self adjusting system, continuous extremal regulation

TABLE OF CONTENTS [abridged]:

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AM4037979

SUB CODE: DP, MA SUBMITTED: 16Sep63 NR REF SOV: 121

OTHER: 037 DATE ACQ: 06Apr64

Card 2/2

KRASOVSKIY, A.A. (Moskva)

Entropy stability of linear continuous automatic control systems.
Izv. AN SSSR. Tekh. kib. no.5:19-26 S-O '63. (MIRA 16:12)

L 17158-63 EPA(b)/EWT(1)/FCC(w)/FS(v)-2/BDS/ES(v) AFFTC/AFMDC/
ESD-3/APGC/SSD Pd-4/Pe-4/Pg-4/Po-4/Pq-4 GW

ACCESSION NR: AT3006848 S/2560/63/000/016/0211/0225

85

AUTHOR: Aleksakhin, I. V.; Krasovskiy, A. A.; Lebedev, P. I.; Yakovleva, A. I.

TITLE: Determination of the parameters of the initial orbits of artificial earth satellites

SOURCE: AN SSSR. Iskusst. sputniki Zemli, no. 16, 1963, 211-225

TOPIC TAGS: satellite orbit, orbital element, satellite launching, coordinate system, initial orbit, orbital parameter, rocketry

ABSTRACT: Based on the theory of undisturbed planetary motion, working formulas have been obtained for computing: 1) the parameters of the initial orbit based on given parameters of the motion of the center of satellite mass at the moment of going into orbit, and 2) partial derivatives from the parameters of the initial orbit on the basis of the parameters of motion of the center of satellite mass in the launch and initial launch coordinate systems at the moment of going into orbit. Four Cartesian rectangular coordinate systems are employed, i.e., launch, ground, sidereal, and

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initial launch. Initial satellite orbit is here understood to be the orbit of motion in the central gravitational field described by the Newtonian potential in the absence of perturbing forces. The parameters of the initial orbit are functions of the following parameters of motion of the center of satellite mass at the moment of assuming orbit: 1) parameters determining the moment the satellite assumes orbit, 2) parameters determining the position of the earth in space, 3) parameters determining the position of the launch coordinate system on the surface of the earth, and 4) parameters determining the coordinates and velocity components of the center of satellite mass in the launch coordinate system at the moment of assuming orbit. Orig. art. has: 90 formulas.

ASSOCIATION: none

SUBMITTED: 20Jul62 DATE ACQ: 08Aug63 ENCL: 00

SUB CODE: AS NO REF SOV: 003 OTHER: 000

Card 2/2

KRASOVSKIY, A.A. (Moskva)

Quasi-stationary process in continuous optimalizing control with coordinate limitation. Avtom. i telem. 24 no.12:1633-1642 D '63.
(MIRA 17:1)

NIKOLAYEV, Andrey Grigor'yevich; PERTSOV, Sergey Viktorovich;
PERESLEGIN, S.V., retsenzent; FEDIN, V.T., retsenzent;
KRASOVSKIY, A.A., prof., doktor tekhn.nauk, nauchn. red.
MASHAROVA, V.G., red.

[Radar detection of thermal radiation; passive radar] Radioteplolokatsiia; passivnaia radiolokatsiia. Moskva, Sovetskoe radio, 1964. 334 p. (MIRA 17:12)

L 55001-65 EWT(d)/EPF(n)-2/EWR(w)/EWP(k)/EWP(h)/EWR(1) Po-4/Pq-4/Pf-4/Pg-4/
ACCESSION NR: AT5008639 Pu-4/Pl-4/Pl-4 IJP(c) S/0000/64/000/000/0079/0092
WW/GS/BC

46
45
B+1

AUTHOR: Krasovskiy, A. A.

TITLE: Optimum search methods in continuous and sampled data optimalizing control systems

SOURCE: International Federation of Automatic Control. International Congress. 2nd, Rome, 1962. Samonastraivayushchiyesya avtomaticheskiye sistemy (Self-adaptive automatic control systems); trudy simpoziuma. Moscow, Izd-vo Nauka, 1964, 79-92

TOPIC TAGS: optimal control theory, continuous process, sampled data system, search process optimization

ABSTRACT: The author examines some problems of optimum search. The solution of the problem depends heavily upon *a priori* information regarding the characteristics of the object and of the noise. However, the more perfect the adaptive system, the less *a priori* information it requires. A search system can theoretically minimize the amount of necessary *a priori* information. Therefore in this

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article only problems in which the *a priori* information of the object is a minimum are considered, i.e. when nothing is known about the characteristics of the object. In continuous and sampled data optimalizing control systems the components of the gradient of the function F which expresses the characteristics of the object are taken as a measure of the deviation from the optimum. The optimum linear operator is that which guarantees the greatest precision in determining the components of the gradient in a given time interval. It is shown that the optimum operation for determining the components of the gradient from the class of all realizable linear operators is synchronous detection of the form

$$U_i = \frac{1}{\overline{\delta x_i^2}\, T} \int\limits_{t-T}^{t} \delta x_i F_i \, dt,$$

when the following conditions are met:

$$\left(\int\limits_{t-T}^{t} \delta x \, dt = 0 \right)$$

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x_i = component of input vector = $x_i^* + \delta x_i + \delta x_{in}$

x_i^* = "working" term

δx_i = search term

δx_{in} = noise term

Orthogonality

$$\int_{t-T}^{t} \delta x_i \delta x_j dt = \begin{cases} 0 & ; i \neq j, \\ \delta x_i^2 T & ; i = j, \end{cases}$$

$$\int_{t-T}^{t} \delta x_i \delta x_j \delta x_k dt = 0.$$

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Constant values of input working coordinates (x_i^t = const. during integration time τ)

$$\int_{t-T}^{t} \delta x_i(\tau)\, \delta \overline{F}_0 \, d\tau = 0,$$

$$R(\tau, \tau_1) < [F_0(\tau) + \overline{\delta F_0}]\, [F_0(\tau_1) + \overline{\delta F_0}],$$

where R is the correlation function. In accordance with this proof the mentioned conditions are sufficient but not all are necessary. Therefore the general conditions for optimality of synchronous detection as illustrated in the method for determining the components of the gradient are obviously broader than in the case given here. In many cases the extremal equation of the characteristics of the object $F(x_1, x_2, \ldots, x_n)$ have several extrema from which the one corresponding to some criterion must be selected, e.g. that having the greatest absolute value. The complex nature of F and the presence of several extrema may have the same significance in the control of real industrial objects, as in the solution of the problem of the automatic synthesis of control systems with the aid of an optimizer.

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L 55001-65
ACCESSION NR: AT5008689

This question of searching procedures in the case of multiple extremes is examined in some detail.

ASSOCIATION: none

SUBMITTED: 26Nov64 ENCL: 00 SUB CODE: DP

NO REF SOV: 009 OTHER: 001

Card 5/5

ALEKSAKHIN, I.V.; KOMPANIYETS, E.P.; KRASOVSKIY, A.A.

Space routes of "diurnal" artificial earth satellites. Kosm. issl. 2 no.4:532-538 Jl-Ag '64. (MIRA 17:9)

L 19867-65 EWT(d) Pg-4/Pq-4/Pg-4/Pk-4/Pl-4 IJP(c)/ASD(a)-5/AFMD(p)/ESD(db)
BC

ACCESSION NR: AP4048819 S/0280/64/000/005/0003/0015

AUTHOR: Krasovskiy, A. A. (Moscow)

TITLE: Entropy change in continuous dynamic systems

SOURCE: AN SSSR. Izv. Tekhnicheskaya kibernetika, No. 5, 1964, 3-15

TOPIC TAGS: automation, control system entropy, continuous dynamic system, random perturbation

ABSTRACT: This article is a continuation of the author's previous work on the entropy of control systems (Izv. AN SSSR, Tekhnicheskaya Kibernetika, 1963, No. 5), only now the effect of random external perturbations is taken into account. Two types of entropy are considered: macroentropy or entropy in the usual information theory sense, i.e. a measure of uncertainty in the macrocoordinates of the system, and microentropy or entropy in the thermodynamic sense. A general expression for the rate of change of the macroentropy of an arbitrary nonlinear dynamic system, subject to random perturbations, is derived. The total macroentropy due to thermal noise of a linear passive system with reactive coupling is derived by proving the following theorem:

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$$H = \ln \frac{(2\pi ekT)^n}{\sqrt{|m||c|}}, \quad (1)$$

where the moment matrices satisfy the equations

$$mM_{\dot{q}\dot{q}} = kTE, \quad cM_{qq} = kTE, \quad (2)$$

$|m|$ and $|c|$ are determinants of system coefficient matrices,

$$M_{qq} = \| M[q_i q_k] \|, \quad M_{\dot{q}\dot{q}} = \| M[\dot{q}_i \dot{q}_k] \|, \quad (3)$$

$[E]$ is the unit matrix, q is the generalized system coordinate and n is the number of elements (loops) in the system, whose temperature T is assumed to be equal. If a collection

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ACCESSION NR: AP4048819

of Lagrangian elements, each having one degree of freedom and describable by

$$m_{ii}q_i + r_{ii}q_i + c_{ii}q_i = P_i \quad (i = 1, 2, \ldots, n), \tag{4}$$

where P_l is the generalized forcing function, are coupled by active or passive means by letting

$$P_l = P_l(Q_1, q_2, \ldots, q_n)$$

then the system

$$m_{ii}q_i + r_{ii}q_i + c_{ii}q_i - P_i(q_1, q_2, \ldots, q_n) = 0$$

is called a semilinear isolated system with Lagrangian elements and its macroentropy is only due to random initial conditions. It is shown that for such system the sum of the

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macroentropy H and of the half-microentropy H_m is always constant. H_{mi} for one section is defined by

$$dH_{mi} = dQ_i/2U_i \qquad (5)$$

where dQ_i is the amount of heat generated by the element and U_i is its kinetic energy (or equivalent). When $2U_i \sim kT_i$, the total increase dH_m becomes proportional to the entropy increase in the thermodynamic sense. It is concluded that in order to assure the entropy stability of systems with Lagrangian elements, it is necessary to have elements which can radiate heat. An ordering of the macrosystem is accompanied by an increase in half-microentropy. It is thus required to have not only the necessary regulatory devices but also a medium whose half-microentropy can increase. Orig. art. has: 42 equations and 3 figures.

ASSOCIATION: None

SUBMITTED: 15Feb64 ENCL: 00 SUB CODE: IE, TD

NO REF SOV: 005 OTHER: 000

Card 4/4

L 41222-65 EWT(d)/EEC(k)-2/EEC(t)/EED-4/EED-2/EWP(1) Pn-4/Po-4/Pq-4/Pg-4/Pk-4/ Pl-4 IJP(c) BB/GG

ACCESSION NR: AT4045205 S/2588/64/000/006/0054/0063

AUTHOR: Krasovskiy, A. A.

TITLE: Systems for the processing of information with optimal control by means of a model of the control process

SOURCE: Avtomaticheskoye upravleniye i vychislitel'naya tekhnika, no. 6, 1964, 54-63

TOPIC TAGS: information processing, optimal control, electrosimulation, control model

ABSTRACT: The author points out in this article that for the greatest accuracy in the information processing system itself, there must be an application of various data on the basis of the maximum use of the information available with respect to the control process. He also points out that the above objective is best realized in systems for which there is a model of the control process. After discussing the mathematical principles involved, the author provides examples of 5 different types of control models, as follows: (1) A control system with a model for deflection; (2) A system with an optimal coordinate control model; (3) A system with an optimal control model; (4) A system with an adjustable unidimensional model with a delay link; and (5) A system with an adjustable multidimen-

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ACCESSION NR: AT4045205

sional model with a delay link. The author states in conclusion that the multiplicity of structures used in connection with continuous searching signals provides a great potential for the future. Orig. art. has: 5 figures and 6 formulas.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: IE, DP

NO REF SOV: 004 OTHER: 001

Card 2/2

L 44742-65 EWT(d) Pg-4 IJP(c)

ACCESSION NR: AP5008321 S/0103/65/026/003/0545/0547

AUTHOR: Krasovskiy, A. A. (Moscow)

18
B

TITLE: Entropy stability of dynamic systems

SOURCE: Avtomatika i telemekhanika, v. 26, no. 3, 1965, 545-547

TOPIC TAGS: dynamic system, nonlinear dynamic system

ABSTRACT: For a dynamic system describable by this set of differential equations $\frac{dx_i}{dt} = \varphi_i(x_1, x_2, \ldots, x_n, t)$ $(i = 1, 2, \ldots, n)$, the following theorem is proven: The time derivative of the system entropy is equal to the sum of mathematical expectations of partial derivatives $\partial\varphi_i/\partial x_i$:

$$\frac{dH}{dt} = \sum_{i=1}^{n} M\left[\frac{\partial\varphi_i}{\partial x_i}\right].$$

Necessary and sufficient conditions of the general entropy stability for the systems describable by differential equations of the first and n-th orders are given. The dynamic system may be entropy-stable but still unstable in the conventional sense. Orig. art. has: 19 formulas.

Card 1/2 Submitted 13 June 63

L 64739-65 EWT(d) IJP(c)

ACCESSION NR: AP5021847 UR/0280/65/000/004/0014/0023

AUTHOR: Krasovskiy, A. A. (Moscow)

TITLE: Statistical stability of motion of nonlinear dynamic systems and integral estimates of moments

SOURCE: AN SSSR. Izvestiya. Tekhnicheskaya kibernetika, no. 4, 1965, 14-23

TOPIC TAGS: motion stability, statistical stability, dynamic system, nonlinear differential equation

ABSTRACT: Dynamic systems described by the system of nonlinear differential equations of the form

$$\boxed{\dot{x}_i = F_i(x_1, x_2, \ldots, x_n) \quad (i = 1, 2, \ldots, n)} \qquad (1)$$

where F_i ($i = 1, 2, \ldots, n$) are analytic functions, with random initial conditions are analyzed. For establishing the statistical stability of dynamic systems, not the variation of the distribution function of random coordinates of system (1), but the variation of moments of any order of these coordinates is considered. Integral estimates of these moments are studied together with the moments of coordinates. It is considered that undisturbed motion $x_i = 0$ ($i = 1, 2, \ldots, n$) of system (1) is

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ACCESSION NR: AP5021847

statistically stable if, for any initial distribution function corresponding to the finite initial values of moments, all moments tend to zero at $t \to \infty$ or all integral estimates of moments tend to the certain finite value at $t \to \infty$. Infinite systems of algebraic equations for moments and their integral estimates are set up upon the assumption that the dynamic system is statistically stable. The method for the successive solution of these equations is presented which makes it possible to find approximate expressions for integral estimates of moments in terms of coefficients of system (1) and the initial values of moments. Utilizing the integral estimates of moments, the optimum performance criterion can be established on the basis of which the optimal parameters of the dynamic systems can be chosen. Examples illustrate the application of the method presented. Orig. art. has: 1 figure and 23 formulas.

[IS]

the application of the method [illegible]. Orig. art. has: 1 figure and 22 formulas.

[KS]

ASSOCIATION: none

SUBMITTED: 28Dec[illegible] ENCL: 00 SUB CODE: MA, DP

NO REF SOV: 001 OTHER: 001 ATD PRESS: [illegible]

Card 2/2

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R00082611

L 00812-66 EEO-2/EWT(1)/EEC-4/EED-2/EWA(h) ESD JM

ACCESSION NR: AP5015906 UR/0103/65/026/006/1026/1036
62-501.1

AUTHOR: Krasovskiy, A. A. (Moscow)

29
B

TITLE: Linear passive systems subjected to internal thermal noise 25

SOURCE: Avtomatika i telemekhanika, v. 26, no. 6, 1965, 1026-1036

TOPIC TAGS: linear passive system, thermal noise

ABSTRACT: An intrinsic-thermal-noise correlation-matrix theorem is suggested for any linear passive system describable by the Lagrange equations and existing in a state of thermal equilibrium (all system components have the same temperature). The proof is based on a special postulate of thermal-noise spectral-density matrix and on V. S. Pugachev's equations describing the moments of a system subjected to white noise (Trans. of VVIA, no. 18, 1944). General formulas are developed for dispersions, cross moments of macro-coordinates, and entropy, and also for mean kinetic and potential energies of system thermal fluctuations. These examples illustrate the use of the above formulas: maximum random drift of a gyroscope operating in a viscous medium, thermal noise in a multiwinding transformer, thermal vibrations of a string galvanometer. Orig. art. has: 4 figures and 80 formulas.

Card 1/2

L 0812-66

ACCESSION NR: AP5015906

ASSOCIATION: none

SUBMITTED: 21Apr64 ENCL: 00 SUB CODE: DP, TD

NO REF SOV: 006 OTHER: 000

Card 2/2

KRASOVSKIY, [illegible]

Thermal oscillations of linear passive systems. Zhur. tekh. fiz. 35 no.9:1537-1545 S '65. (MIRA 18:10)

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R00082611O(

DUKOR, Zakhar Grigor'yevich; CHERTKOV, Khaim Ayzikovich; GUREVICH, Sh.M., retsenzent; KRASKOVSKIY, B.A., retsenzent; CHERTKOV, K.A., red.; KAN, P.M., red. izd-va; BODROVA, V.A., tekhn. red.

[Technical, industrial, and financial plan of a ship repair enterprise] Tekhpromfinplan sudoremontnogo predpriiatiia. Moskva, Izd-vo "Rechnoi transport," 1962. 238 p. (MIRA 16:5)
(Ships--Maintenance and repair)

KRASKOVSKIY, G.V. [Kraskouski, H.V.]

Homotransplantation in adult organisms. Vestsi AN BSSR. Ser. biial. nav. no.3:33-41 '63 (MIRA 17:7)

KRASKOVSKIY, K.I., inzh.

Remarks on V.I. Prokof'ev and A.F. Kamershtein's article "Establishing technical principles for calculating and designing pipelines" Stroi. truboprov. 3 no.10:9-10 O '58. (MIRA 11:11)
(Petroleum--Pipelines)

KRASKOVSKIY, K.I., inzh.

Draft of standards and technical specifications for the design of large petroleum and petroleum products pipelines. Stroi. truboprov. 6 no.9:10 S '61. (MIRA 14:9)

(Petroleum--Pipelines)

KRASKOVSKIY, K. I.

Determining the layout of parallel pipelines. Stroi. truboprov. 8 no.4:8-10 Ap '63. (MIRA 16:4)

1. Gosudarstvennyy institut po proyektirovaniyu magistral'nykh truboprovodov.

(Pipelines—Desi~n and construction)

APPROVED FOR RELEASE: Monday, July 31, 2000 CIA-RDP86-00513R00082611000

KRASKOVSKIY, R.A.

Calculating the entropy of the optical image and determining the virtual size of flare figures. Usp.nauch.fot. 10:23-30 '64. (MIRA 17:10)

KRASKOVSKY, S. A.

Kraskovsky, S. A. "A Study of the Temperature of the Earth." Sotsial'naia Rekonstruktsiia i Nauka, Moscow, No. 7, 1935, pp. 45-51.

KRASKOVSKY, S. A.

Kraskovsky, S. A. "Concerning the Importance and Organization of Geothermal Work in the Area of the Great Donbass." Ugol, Kharkov, No. 150, 1938, pp. 51-55.

KRASKOVSKY, S. A.

Kraskovsky, S. A. "Utilization of the Thermal Energy of Deposits in the Interior of the Earth." Priroda, Moscow, No. 3, 1939, pp. 53-56.

KRASKOVSKIY, S. A.

Inst. Geological Work, Acad. Sci., (-1943-)

"Measurement of Temperature in Salt Mines,"

Iz. Ak. Nauk SSSR, Ser. Geograf. i Geofiz., No. 3, 1943

KRASKOVSKIY, S.A.

Thermal cycles of mineral deposits. Vest. LGU 3 no.9:105-107
S '48. (MIRA 12:9)
(Earth temperature)

KRASKOVSKIY, S. A.

42296: KRASKOVSKIY, S. A. - O termal'nom rezhime ugol'nykh mestorozhdeniy. Trudy Geol.-izzled. byuro (M-vo ugol'noy prom-sti Zap. r-nov SSSR, Geol.-razvedoch. upr.) VYP. 4, 1948, s. 5-16.

SO: Letopis' Zhurnal'nykh Statey, Vol. 47, 1948.

PA5/49T53

USSR/Geophysics
Temperature - Measurements

Mar/Apr 48

"The Temperature Gradient in the Earth's Crust," S. A. Kraskovskiy, Leningrad, 2 pp

"Iz v-s Geog Obshch" Vol LXXX, No 2

Hoefer, Koenigsberger, Hermann and others wrongly attributed temperature gradient to mineral deposits. Lack of international agreement on taking readings and working out results makes generalization difficult. Moreover, most observations have been made in sedimentary rocks and only a few in crystalline. Recommends wide appli-

~~5/49T53~~

USSR/Geophysics (Contd)

Mar/Apr 48

cation of method used by G. K. Gilbert in Georgia.

5/49T53

KRASKOVSKIY, S. A.

KRASKOVSKIY, S. A.

PA 10/49T70

USSR/Geology
Volcanology

Jul/Aug 48

"Industrial Utilization of Volcanic Steam and Heat," (Italian), S. A. Kraskovskiy, 3 3/4 pp

"Izv-a Geograf Obshch" Vol LXXX, No 4

Based on article by V. D. Keller and A. Valdug, "The Natural Steam at Lardello Italy" in "The Journal of Geology" Vol LIV, No 5, 146. Mentions use of thermal energy in other parts of world. Discusses prospects of introducing scheme in USSR.

10/49T70

KRASKOVSKIY, S.A.

35295. Termometr (K-47) Dlya izmereniya temperatury porody V Gornykh Vyrabotkakh. Ugol', 1949, No. 11, S. 29-30

SO: Letopis' Zhurnal'nykh Statey. Vol. 34, 1949 Moskva

Vo

1ST AND 2ND ORDERS PROCESSES AND PROPERTIES INDEX 3RD AND 4TH ORDERS

5383. THERMOMETER (K - 47) FOR MEASURING TEMPERATURE OF ROCK IN MINE WORKINGS. Kniupfer, N. P. and Kraskowskij, S. A. (Ugol (Coal), No. 1949, 29-30). The authors, with the assistance of the Girponikel-Institut at Leningrad, have constructed an electric thermometer especially adapted to the measurement of rock temperature. The device consists of a copper thermometer and Wheatstone bridge. The thermometer is mounted in a protecting paper sheath treated with bakelite and fitted with a brass cap. The diamter of the sheath and of the cap is 30 m.m.; the cap has the form of a truncated cone (60° angle), 5 m.m. in diameter at the top, and the thickness of the walls of the cap is about 1 m.m., and that of the blunt extremity 3 m.m. A alyer of paper provides electric insulation between cone and winding. The winding consists of an enamelled copper wire 0.05 m.m. in diameter wound in a single layer round a paper cone, the size of which is equal to the inner cone of the cap. By means of an inner thread the cap is screwed to the bakelite pipe. On the other end of the pipe is a brass muff; into the latter is screwed an aluminium pipe, to which three other similar pipes may be added consecutively, giving a total length of 3 m. The thermometer is introduced into a hole of 2.5 m. length. Round the paper cone are

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

-ound more than 1 m. of copper wire, of resistance 118 ohms at 16°C. The active arm is connected with the bridge by means of a twin-core cable of 4 m. length; the section of each core is 0.75 m.m.^{2} The whole equipment is carried in a wooden case. The instrument is a three-range one; the precision of reading is ± 0.20. Current is supplied by two dry cells, which do not need replacement more often than 2 - 3 times per year. Tests showed the instrument to be suitable for measurement of temperatures between -4.8°C. and +85.5°C. (L)

N.C.B.

KRASKOVSKIY, S. A.

Meteorological Abst.
Vol. 4 No. 2
Feb. 1953
Radiation and
Temperature

4.2-153 551.525.4(47)

Kraskovskii, S. A., O normal'nom temperaturnom gradiente zemnoi kory. [The normal temperature gradient of the earth's crust.] Vsesoiuznoe Geograficheskoe Obshchestvo. Izvestiia, 83(5):523-525, Sept.-Oct. 1951. 11 refs. DWB--An article questioning the correctness of the widely accepted theory evaluating the so-called mean temperature gradient of the earth's crust at 32°/km. Through a review of historical material, the author shows how this value of gradient originated and was adopted by science. First, he asserts that this mean value calculated according to values obtained by Cordier, Reich, Naumann, Everett, Prestowich, Thoma, Konigsberger (which were all different) and taken with aid of inert and Magnus geothermometers in bore holes made in sedimentary rocks is not precise and absolute, since overwelming accurate thermic material for all parts of the globe is now availabe. However, no complete analysis of this material has yet been made. The Use of a statistical method for obtaining the mean gradient, as applied by H. Landsberg at the University of Chicago in 1946-1947, without discounting geological conditions is, according to the author, incorrect. In general, the application of such a mean gradient obtained in sedimentary rocks for calculating the thermic flow and solving other theoretical and practical problems is basically wrong. Such calculations can be made only on the basis of a "normal" gradient of the earth's crust, obtained by measuring the temperature in crystalline rocks forming the structure of the earth's crust, but not in sedimentary rocks. Up to now the number of temperature measurements in crystalline rocks are not great but even these results show that the gradient in crystalline rocks differs much from the gradient of sedimentary series. All of them (gradients) lie in the interval between 6-18°/km. The normal gradient of the earth's crust will probably not surpass 10-12°/km, which is three times smaller than the value now prevailing. Subject Headings: 1. Earth temperatures. 2. Temperature gradient. 3. U.S.S.R.—A.M.P.

EH
6/26/54

KRASKOVSKIY, Sergey Aleksandrovich, kandidat geologo-mineralogicheskikh nauk; USPENSKAYA, N.V., redaktor; DMITRIYEVA, R.V., tekhnicheskiy redaktor

[Heat of the earth's interior and prospects of its use] Glubinnoe teplo zemli i perspektivy ego ispol'zovaniia. Moskva, Izd-vo "Znanie", 1955. 31 p.(Vsesoiuznoe obshchestvo po rasprostraniiu politicheskikh i nauchnykh znanii. Ser.3, no.31) (MLRA 8:10)
(Earth temperature)

KRASKOVSKIY,S.A.

Mexican volcano, Paricutin. Izv.Vses.geog.ob-va 87 no.2:
179-181 Mr-Ap '55. (MLRA 8:9)
(Paricutin)

SOV/146-1-1-19/22

AUTHOR: ~~Kraskovskiy, S.A., Can~~didate of Geological and Mineral-ogical Sciences

TITLE: A.Beck; J.C.Jaeger and G.Newstead. The Measurement of the Thermal Conductivity of Rocks in Boreholes (Izmereniya teploprovodimosti porod v burovykh skvazhinakh)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy - Priborostroyeniye, 1958, Nr 1, pp 134-135 (USSR)

ABSTRACT: The paper discusses the article "The Measurement of the Thermal Conductivities of Rocks by Observation in bore-holes", A.Beck, J.C.Jaeger and G.Newstead, Australian Journal of Physics, 1956, Vol. 9, Nr 2, pp 286-296, describes the device in question and its technical data.

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